

FIG. 1

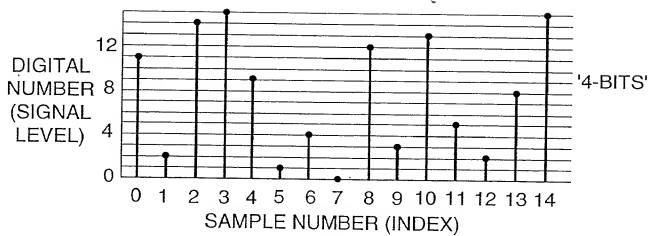


FIG. 4

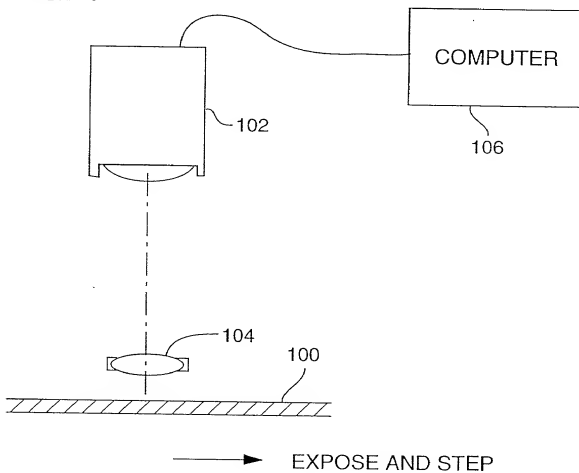
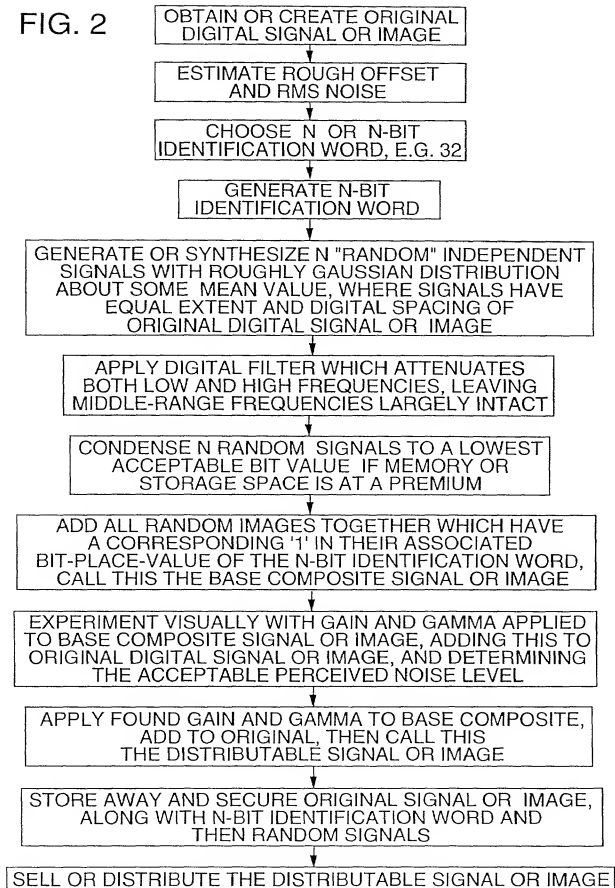
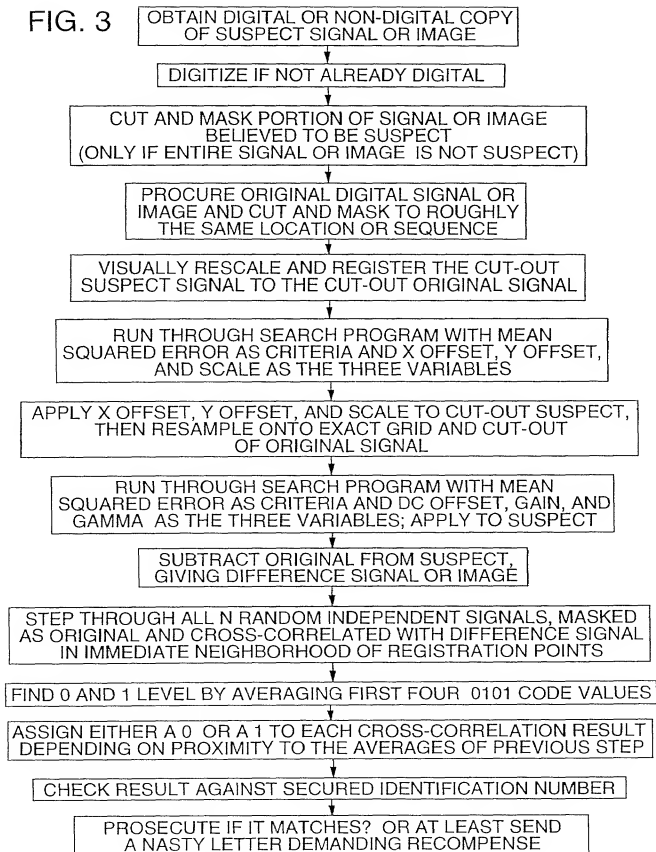


FIG. 2



09775021, 020601

FIG. 3



0073621 0001

FIG. 5

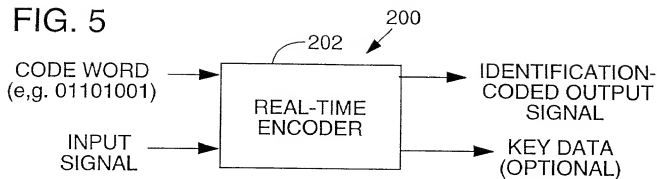
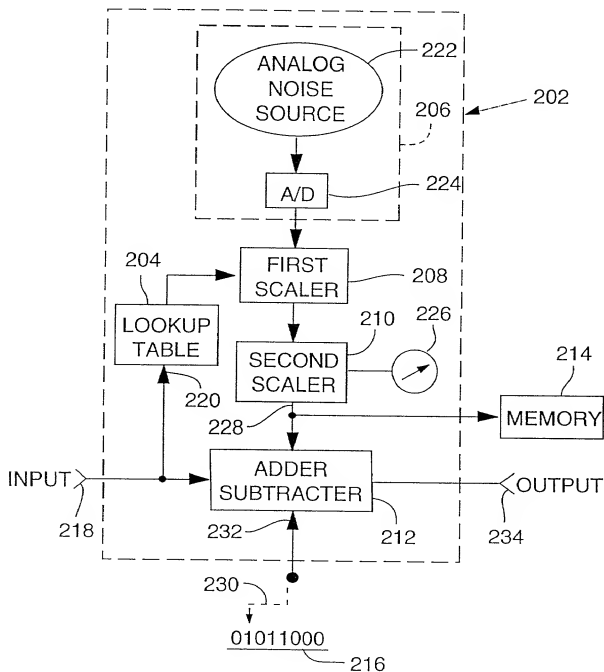


FIG. 6



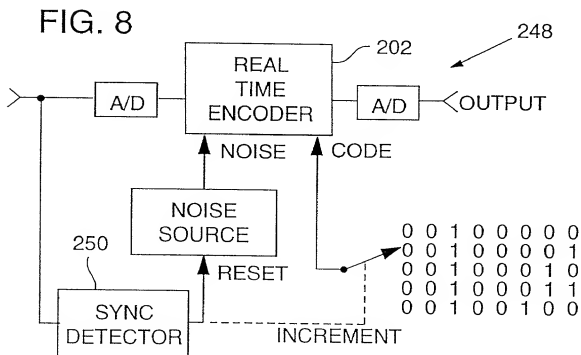
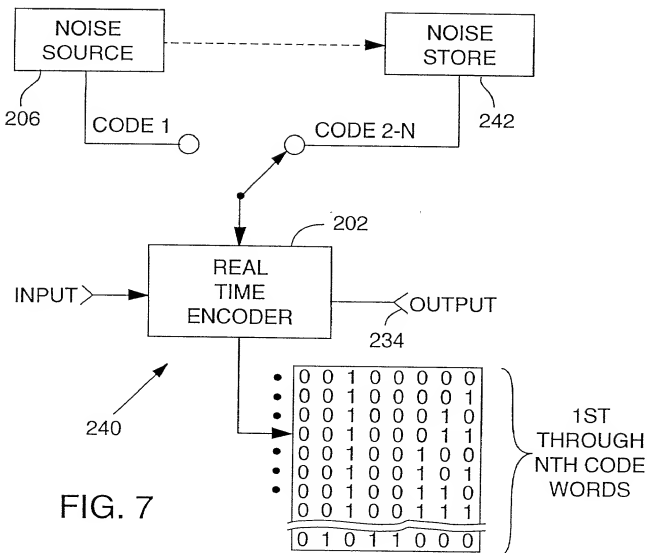


FIG. 9A

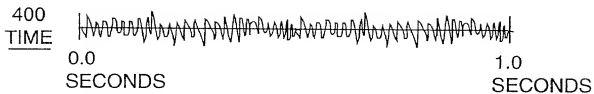


FIG. 9B

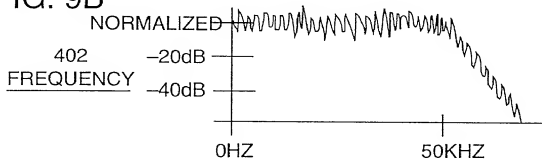


FIG. 9C

BORDER  
CONTINUITY  
404

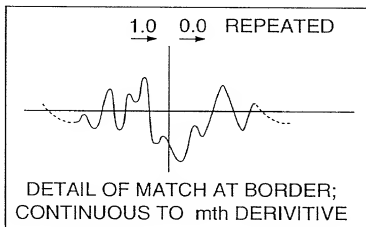


FIG. 10

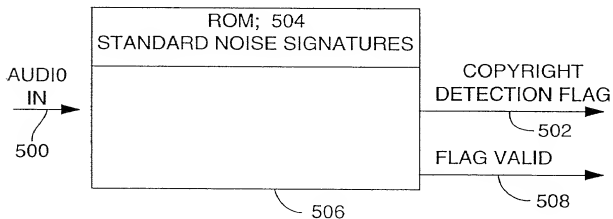


FIG. 11

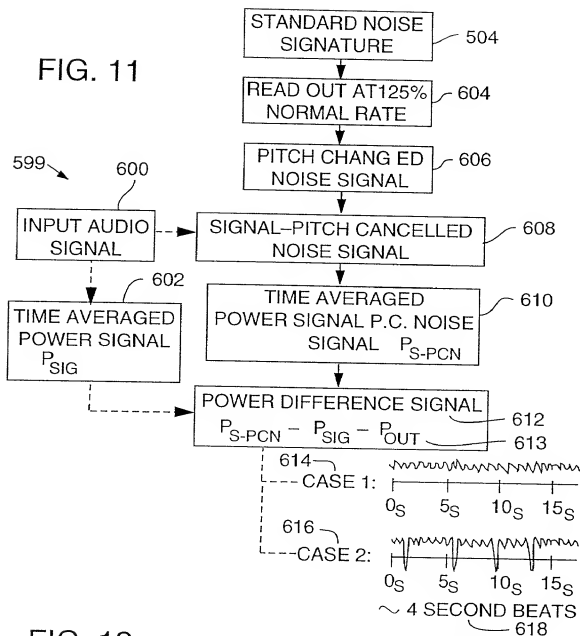


FIG. 12

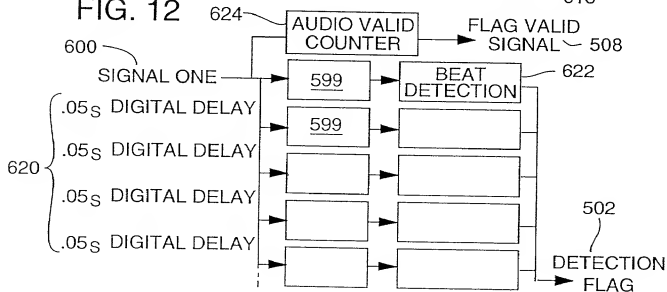
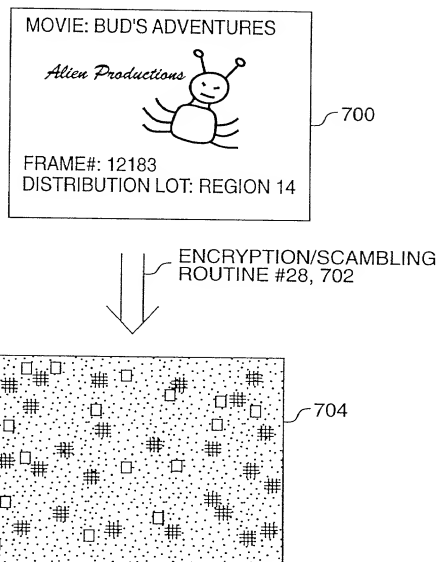


FIG. 13



PSEUDO-RANDOM MASTER SNOWY IMAGE  
(SCALED DOWN AND ADDED TO FRAME 12183)





FIG. 15

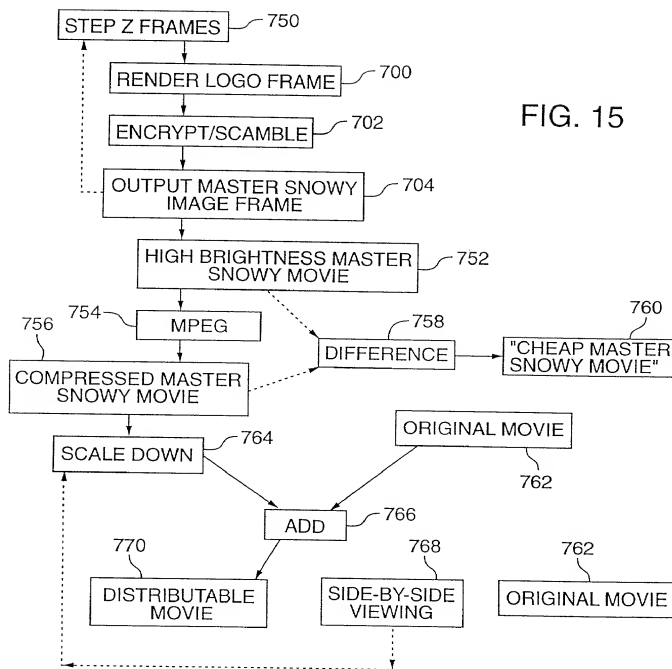


FIG. 16

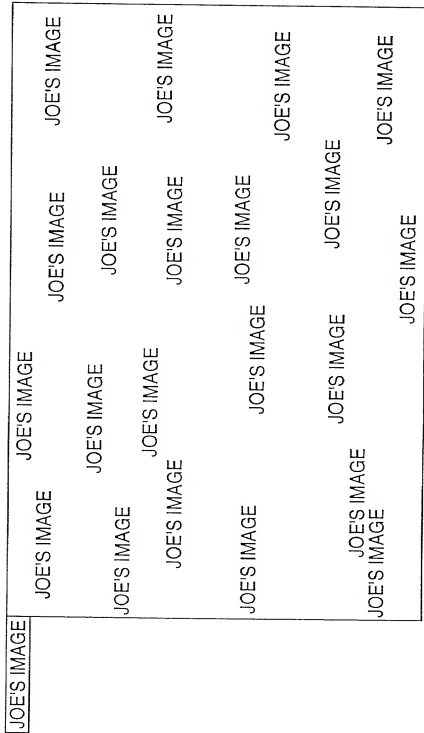
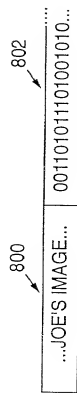


FIG. 17

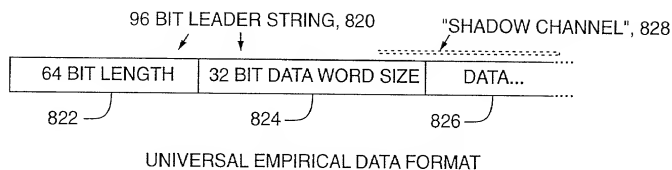


FIG. 18

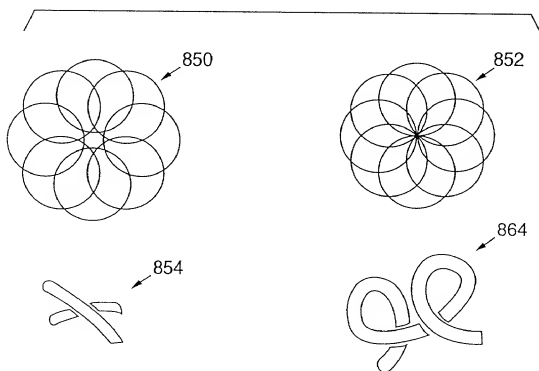
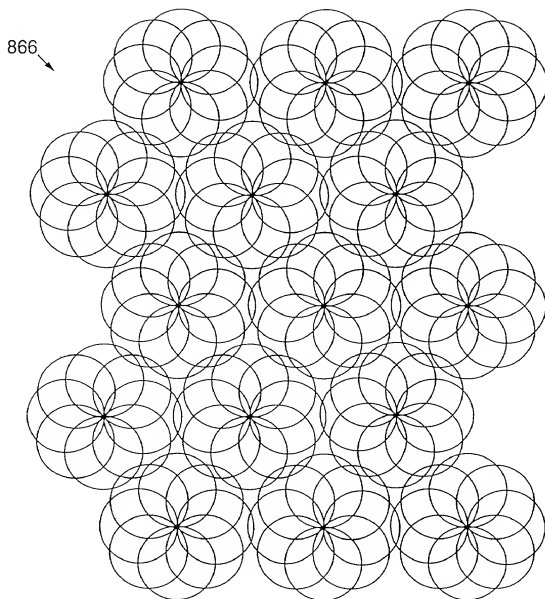
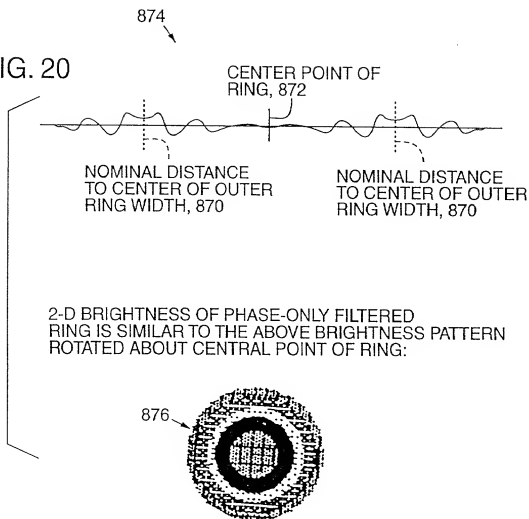


FIG. 19

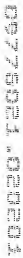


QUEST FOR MOSAICED KNOT PATTERNS WHICH "COVER" AND  
ARE COEXTENSIVE WITH ORIGINAL IMAGE;  
ALL ELEMENTAL KNOT PATTERNS CAN CONVEY THE SAME  
INFORMATION, SUCH AS A SIGNATURE, OR EACH CAN CONVEY A  
NEW MESSAGE IN A STEGANOGRAPHIC SENSE

FIG. 20

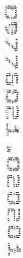


$\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$   $\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$



$\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$   $\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$

$\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$   $\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$



$\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$   $\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$

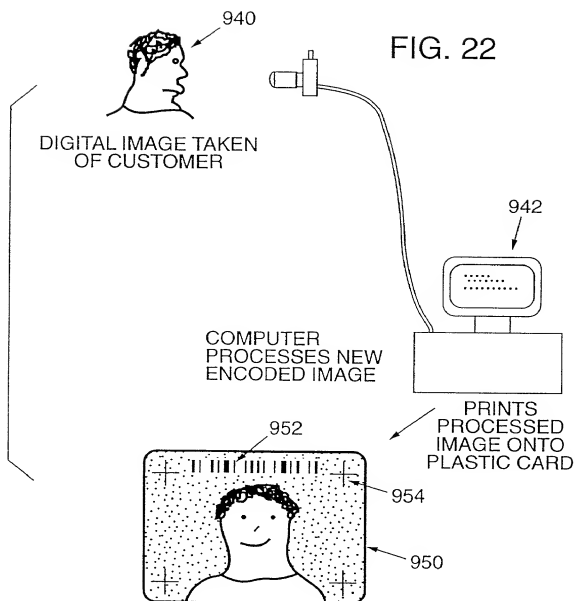
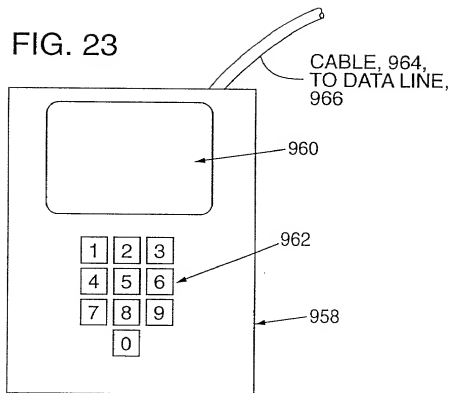




FIG. 23



CONTAINS RUDIMENTARY OPTICAL SCANNER,  
MEMORY BUFFERS, COMMUNICATIONS DEVICES,  
AND MICROPROCESSOR

CONSUMER MERELY PLACES CARD INTO WINDOW  
AND CAN, AT THEIR PREARRANGED OPTION, EITHER  
TYPE IN A PERSONAL IDENTIFICATION NUMBER  
(PIN, FOR ADDED SECURITY) OR NOT. THE TRANSACTION  
IS APPROVED OR DISAPPROVED WITHIN SECONDS.

FIG. 24

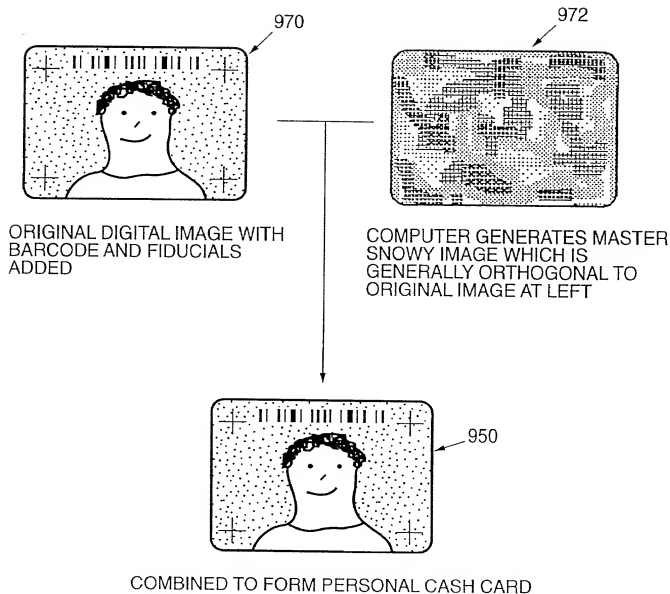
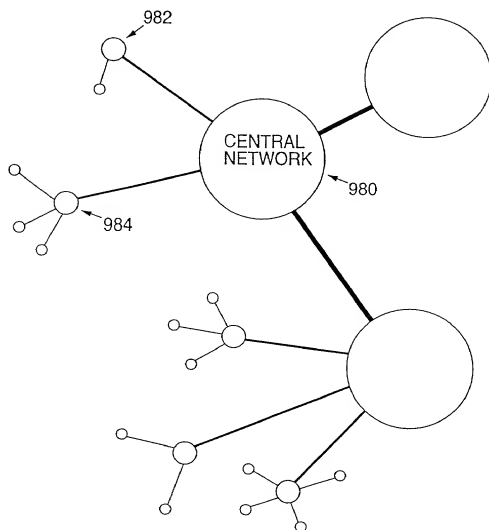


FIG. 25 TYPICAL TRANSACTION STEPS

1. READER SCANS IMAGE ON CARD, STORES IN MEMORY, EXTRACTS PERSON'S ID
2. OPTIONAL: USER KEYS IN PIN NUMBER
  3. READER CALLS CENTRAL ACCOUNT DATA NETWORK, HANDSHAKES
  4. READER SENDS ID, (PIN), MERCHANT INFORMATION, AND REQUESTED TRANSACTION AMOUNT TO CENTRAL NETWORK
  5. CENTRAL NETWORK VERIFIES ID, PIN, MERCHANT INFO, AND ACCOUNT BALANCE
  6. IF OK, CENTRAL NETWORK GENERATES TWENTY-FOUR SETS OF SIXTEEN DISTINCT RANDOM NUMBERS, WHERE THE RANDOM NUMBERS ARE INDEXES TO A SET OF 64K ORTHOGONAL SPATIAL PATTERNS
  7. CENTRAL NETWORK TRANSMITS FIRST OK, AND THE SETS OF RANDOM NUMBERS
8. READER STEPS THROUGH THE TWENTY-FOUR SETS
  - 8A. READER ADDS TOGETHER SET OF ORTHOGONAL PATTERNS
  - 8B. READER PERFORMS DOT PRODUCT OF RESULTANT PATTERN AND CARD SCAN, STORES RESULT
  9. READER TRANSMITS THE TWENTY-FOUR DOT PRODUCT RESULTS TO CENTRAL NETWORK
  10. CENTRAL NETWORK CHECKS RESULTS AGAINST MASTER
  11. CENTRAL NETWORK SENDS FINAL APPROVAL OR DENIAL
  12. CENTRAL NETWORK DEBITS MERCHANT ACCOUNT, CREDITS CARD ACCOUNT

FIG. 26  
THE NEGLIGIBLE-FRAUD CASH CARD SYSTEM



A BASIC FOUNDATION OF THE CASH CARD SYSTEM IS A 24-HOUR INFORMATION NETWORK, WHERE BOTH THE STATIONS WHICH CREATE THE PHYSICAL CASH CARDS, 950, AND THE POINT-OF-SALES, 984, ARE ALL HOOKED UP TO THE SAME NETWORK CONTINUOUSLY

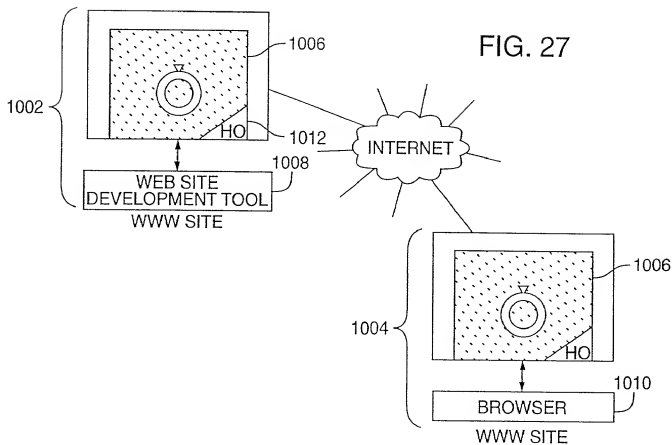


FIG. 28

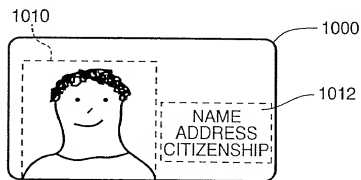
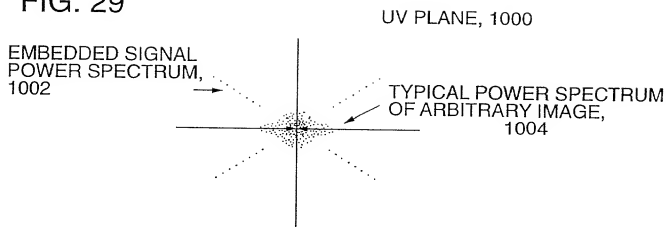
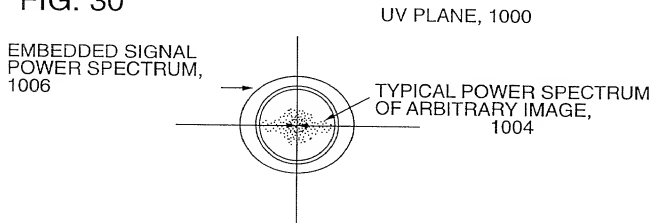


FIG. 29



NON-HARMONIC SPATIAL FREQUENCIES ALONG THE  
45 DEGREE AXES, GIVING RISE TO A WEAVE-LIKE  
CROSS-HATCHING PATTERN IN THE SPATIAL DOMAIN

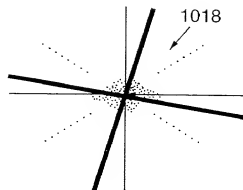
FIG. 30



NON-HARMONIC CONCENTRIC CIRCLES IN UV PLANE,  
WHERE PHASE HOPS QUASI-RANDOMLY ALONG EACH  
CIRCLE, GIVING RISE TO PSEUDO RANDOM LOOKING  
PATTERNS IN THE SPATIAL DOMAIN

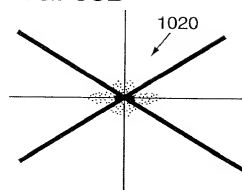


FIG. 33A



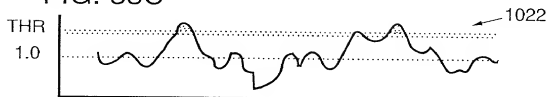
ANGLE A

FIG. 33B



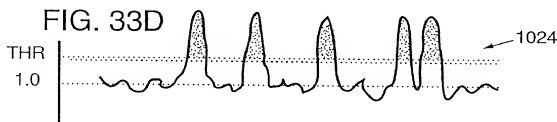
ANGLE B

FIG. 33C



POWER PROFILE ALONG ANGLE A, AS NORMALIZED BY ITS OWN MOVING AVERAGE; ONLY A MINIMAL AMOUNT EXCEEDS THRESHOLD, GIVING A SMALL INTEGRATED VALUE

FIG. 33D



POWER PROFILE ALONG ANGLE B, AS NORMALIZED BY ITS OWN MOVING AVERAGE; THIS FINDS STRONG ENERGY ABOVE THE THRESHOLD

FIG. 33E

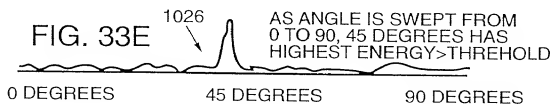




FIG. 34A

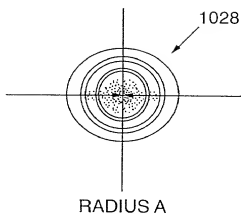


FIG. 34B

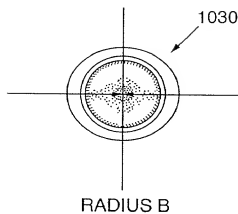


FIG. 34C

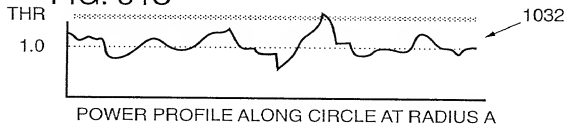


FIG. 34D

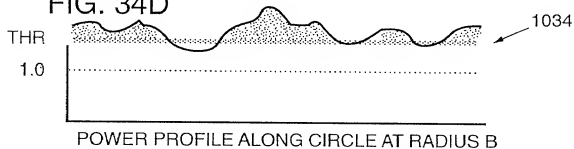
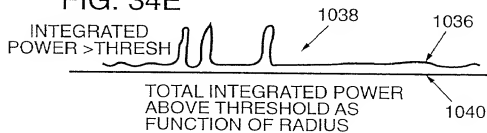
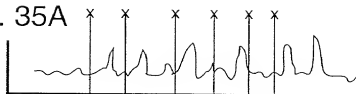


FIG. 34E



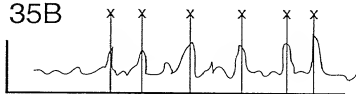
00775024 060201 102020 102020 102020

FIG. 35A



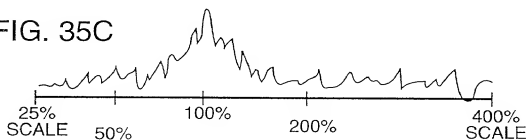
SCALE = A; ADD ALL POWER VALUES AT THE  
"KNOWN" FREQUENCIES", 1042

FIG. 35B



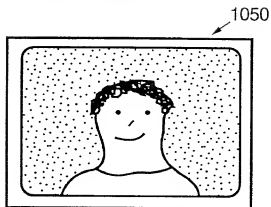
SCALE = B; ADD ALL POWER VALUES AT THE  
"KNOWN" FREQUENCIES", 1044

FIG. 35C



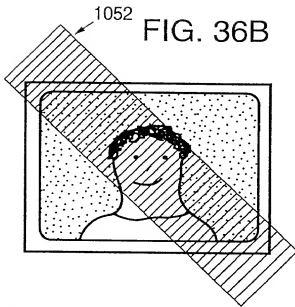
"SCALED-KERNEL" BASED MATCHED FILTER; PEAK IS  
WHERE THE SCALE OF THE SUBLIMINAL GRID WAS  
FOUND, 1046

FIG. 36A



ARBITRARY ORIGINAL IMAGE  
IN WHICH SUBLIMINAL  
GRATICULES MAY HAVE BEEN PLACED

FIG. 36B



"COLUMN SCAN"  
IS APPLIED ALONG A  
GIVEN ANGLE THROUGH  
THE CENTER OF THE  
IMAGE

COLUMN-  
INTEGRATED  
GREY  
VALUES,  
1054

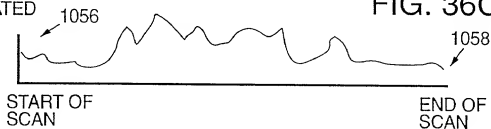


FIG. 36C

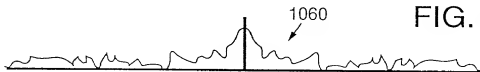


FIG. 36D

MAGNITUDE OF FOURIER TRANSFORM OF SCAN DATA

## FIG. 37

### PROCESS STEPS

1. SCAN IN PHOTOGRAPH
2. 2D FFT
3. GENERATE 2D POWER SPECTRUM, FILTER WITH E.G. 3X3 BLURRING KERNEL
4. STEP ANGLES FROM 0 DEGREES THROUGH 90 (1/2 DEG)
5. GENERATE NORMALIZED VECTOR, WITH POWER VALUE AS NUMERATOR, AND MOVING AVERAGED POWER VALUE AS DENOMINATOR
6. INTEGRATE VALUES AS SOME THRESHOLD, GIVING A SINGLE INTEGRATED VALUE FOR THIS ANGLE
7. END STEP ON ANGLES
8. FIND TOP ONE OR TWO OR THREE "PEAKS" FROM THE ANGLES IN LOOP 4, THEN FOR EACH PEAK...
9. STEP SCALE FROM 25% TO 400%, STEP ~1.01
10. ADD THE NORMALIZED POWER VALUES CORRESPONDING TO THE 'N' SCALED FREQUENCIES OF STANDARD
11. KEEP TRACK OF HIGHEST VALUE IN LOOP
12. END LOOP 9 AND 8, DETERMINE HIGHEST VALUE
13. ROTATION AND SCALE NOW FOUND
14. PERFORM TRADITIONAL MATCHED FILTER TO FIND EXACT SPATIAL OFFSET
15. PERFORM ANY "FINE TUNING" TO PRECISELY DETERMINE ROTATION, SCALE, OFFSET

00776001 000001